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Journal of the Society of Arts.

FRIDAY, AUGUST 14, 1863.

SOCIETY'S MEMORIAL OF THE PRINCE CONSORT.

NOTICE TO MEMBERS.

In accordance with the Report adopted at the General Meeting held on the 17th ult., additional subscriptions for carrying out the Society's Memorial of His Royal Highness the Prince Consort are invited.

Any member desiring to subscribe, or to increase the amount of his subscription, is requested to send a Cheque or Post-office Order, made payable to Mr. Samuel Thomas Davenport, the Financial Officer.

PROGRAMME OF EXAMINATIONS FOR 1864.

PRELIMINARY NOTICE.

I. These Examinations have been established for the benefit of members and students of the Institutions in Union with the Society of Arts. Such persons are commonly mechanics, artisans, labourers, clerks, tradesmen and farmers in a small way of business, apprentices, sons and daughters of tradesmen and farmers, assistants in shops, and others, of various occupations, who are not graduates, undergraduates, or students of a University, nor following nor intending to follow a learned profession, nor enjoying nor having enjoyed a liberal education. To all such members and students, and *persons of the like condition*, male and female, the Examinations, Certificates, and Prizes, described in this Programme, are open on the conditions stated herein.

II. Persons also of a higher grade in society may be examined and receive Certificates, but cannot compete for prizes.

III. Persons who are, or have been, professional Teachers, or Pupil Teachers, may be examined and receive Certificates, but cannot enter into the general competition for prizes.

LIST OF EXAMINERS FOR THE FINAL EXAMINATION IN 1864.

Rev. Alexander Wilson, M.A., National Society, London.

John Ball, Esq., of the firm of Messrs. Quilter and Ball.

J. J. Sylvester, Esq., M.A., F.R.S., Professor of Mathematics at the Royal Military Academy, Woolwich.

Rev. B. Morgan Cowie, M.A., Professor of Geometry at Gresham College; one of H.M. Inspectors of Schools.

John Sykes, Esq., M.A., Fellow of Pembroke College, Cambridge, Assistant-Secretary to the Committee of Privy Council on Education.

Rev. T. G. Hall, Professor of Mathematics in King's College, London.

Rev. Bartholomew Price, M.A., F.R.S., Sedleian Professor of Natural Philosophy in the University of Oxford.

Rev. Joseph Woolley, LL.D., one of Her Majesty's Inspectors of Schools.

Rev. Jonathan Bates, M.A., Fellow of Gonville and Caius College, Cambridge.

T. M. Goodeve, Esq., Professor of Mechanics at the Royal Military Academy, Woolwich.

Charles Brooke, Esq., M.A., F.R.S., Surgeon to the Westminster Hospital.

Jas. Glaisher, Esq., F.R.S., Royal Observatory, Greenwich.

A. W. Williamson, Esq., Professor of Chemistry, University College, London.

John Marshall, Esq., F.R.S., F.R.C.S., Surgeon to the University College Hospital, and Lecturer on Anatomy in the Government Department of Science and Art.

Daniel Oliver, Esq., F.R.S., F.L.S., Professor of Botany in University College, London, and Librarian of the Herbarium of the Royal Gardens, Kew.

J. C. Morton, Esq.

J. Arthur Phillips, Esq., Civil Engineer, Graduate of the Imperial School of Mines of France, &c.

Charles Neate, Esq., M.A., Professor of Political Economy in the University of Oxford.

The Very Rev. Richard Dawes, F.R.S., Dean of Hereford.

Wm. Hughes, Esq., F.R.G.S., Professor of Geography in Queen's College, London.

C. H. Pearson, Esq., M.A., Professor of Modern History, King's College, London.

Rev. Samuel Clark, M.A., F.R.G.S., *Chairman of the Board.*

J. F. Ferrier, Esq., LL.D., Professor of Moral Philosophy and Political Economy in the University of St. Andrew's.

Rev. F. Temple, D.D., Head Master of Rugby School.

Alphonse Mariette, Esq., M.A., Professor of French, King's College, London.

Dr. Bernays, Professor of German, King's College, London

F. S. Cary, Esq.

Thomas Bradley, Esq., Professor of Geometrical Drawing in King's College, London.

John Hullah, Esq.

LOCAL EDUCATIONAL BOARDS.

1. To enable any person, in any locality, in the United Kingdom, to take advantage of the Examinations, there must be in that locality a Local Educational Board in connection with the Society of Arts.

2. For a list of the Local Boards already formed, with the names and addresses of their secretaries, see page 643. Additional Local Boards may be formed wherever the managers of Institutions, or other persons desirous to promote the instruction of adults, may be prepared to co-operate with the Society of Arts.

3. Each Local Board must consist of at least three members; and, with advantage, may be much more numerous. There must be a Chairman and a Secretary. The district for which the Board is to act should be defined; and every Educational Institution within those limits should be represented in the Board. Each Local Board should include the representatives of more Institutions than one, and there should not be more than one Local Board in each locality. The composition of the Board must be such as to command the respect and confidence of the neighbourhood. Where gentlemen of high literary and scientific attainments are willing to serve on the Board, their services are of great value; but the necessary work may be done by any well educated persons of high character and good sense. No member or officer of a Local Board can be admitted to the examinations.

4. Local Educational Boards in connection with the Society of Arts make no payment to the Society, unless they desire to exercise the power of admitting candidates who are not members of any Institution in direct union with the Society of Arts (see paragraph 28 *B*. page 236); in which case a subscription of one guinea a year must be paid.

5. A detailed list of the names, addresses, and designations of the chairman, secretary, and other members, of each Local Board must be submitted to the Council of the Society of Arts before the 1st of February, 1864, when the general list of such Boards will be published.

6. Where a Local Board comprises so large a district that, for the convenience of the candidates, Branch Local Boards have to be formed, lists of these must also be given. All changes in the composition of the Boards must be immediately notified to the Society of Arts.

EXAMINATIONS.

7. The Examinations are twofold:—

The Previous Examinations, by the Local Boards, for persons of any age not under 12.

The Final Examination, by the Central Board, under the supervision of the Local Boards, for persons of any age not under 16.

Previous Examinations by the Local Boards.

8. The Previous Examinations are designed—not only to "sift" the candidates for the Final Examination, but also—to encourage and lead on those who, from the insufficiency of their ages or attainments, may be at present unqualified to undergo it.

9. In "sifting" the candidates above 16, each Local Board has to satisfy itself that those to whom it grants a "pass" to the Final Examination are adequately grounded in Elementary knowledge (in writing, spelling, English grammar and composition, and the common rules of arithmetic), and also are likely to obtain from the Central Board a certificate in the special subject or subjects in respect of which such "pass" is given. This being borne in mind by the Local Boards, the Society of Arts does not desire to prescribe minutely to them how they should satisfy themselves on these points. The best method of sifting the candidates in the Special subjects, is for the Local Boards to examine them by means of printed (or written) questions and written answers; but, where a Local Board finds itself without the means of conveniently holding such an Examination in any Special subject, even with the aid which may be afforded to such Board by the Committee of its Provincial Union, or by an "expert" willing to assist with or without remuneration, it will suffice for such Board to satisfy itself in any other mode, and to state simply that it has satisfied itself that the candidate is fit to be examined by the Central Board in that subject.

10. The sifting in Elementary subjects may be performed in various modes, according to the presumed attainments of the candidates. The Examiners in the Final Examination will certainly reject all ill-written, ill-spelt, ill-composed, or ungrammatical papers that may be laid before them. A candidate once "passed" by a Local Board in the Elementary subjects, may be again "passed" for Examination in any Special subject, without being again "sifted" in the Elementary subjects. Generally it is convenient that the "sifting" of candidates for the Final Examination be held at the same time, and combined, with those Elementary Examinations which the Local Boards are recommended to hold for persons whose insufficiency of age or attainment disqualifies them at present from undergoing the Final Examination. The Local Boards are recommended not only to hold annually such Elementary Examinations, but to grant their own Certificates, and also prizes if possible, to those who pass them with success. Each Local Board may, if it think fit, frame its own regulations, questions, and certificates; but, as it is obviously desirable that as near an approach to uniformity as possible should be obtained, a "Central Committee of Educational Unions" has been formed, which, without in any way exercising authority over the various Local Boards, offers annually for general use a scheme of Elementary Examinations.

11. The Central Committee consists of representatives of each Provincial and District Union and Adult Educational Society in union with the Society of Arts, some members of the Council of the Society of Arts, the Chairman of the Society's Central Board of Examiners, and representatives of Local Educational Boards. This Committee provides a scheme of Elementary Examinations, in two sets of papers, one suited for junior, the other for senior candidates, with corresponding Forms of Certificate, to be awarded by the local authority under which these Examinations are conducted.

12. The following is the Central Committee's scheme of Elementary Examinations for 1864:—

Junior.

1. Every candidate must be examined in the first four rules of Arithmetic, simple and compound.

Male candidates must be examined in any *two*, and females in any *one*, of the three following subjects:—

A. A General knowledge of the Gospel History.
B. The rudiments of English History.
C. The rudiments of the Geography of England.

2. Female candidates must also be examined in plain needle-work.

3. Fair writing and spelling, with good reading of a simple narrative, will be required of every candidate.

4 A satisfactory examination will entitle the candidate to a certificate.

Senior.

1. Every candidate must be examined in Arithmetic, including the Rule of Three, Decimal and Vulgar Fractions.

Male candidates must be examined in any *two*, and females in any *one*, of the three following subjects:—

A. The facts of St. Luke's Gospel and the Acts of the Apostles.
B. English History from the accession of Henry VII. to the accession of James the First, with the rudiments of the history from the Conquest.
C. Geography of the British Isles.

2. Every female candidate must also show proficiency in needle work.

3. All candidates will be required to exhibit in their papers a fairly good handwriting, spelling, and knowledge of grammar.

4. A satisfactory examination will entitle the candidate to a certificate.

13. To prevent the possibility of a premature knowledge of the Examination Papers, the Examinations must be simultaneous everywhere, and in 1864 they must be held on the 1st, 2nd, 3rd, and 4th March, after 4 o'clock p.m.

14. In these Examinations there is no competition for the certificates. They are awarded for positive not comparative merit; but in any locality, if prizes are offered by the local authority, there may be with advantage a competition for such prizes.*

15. The Secretary of each Union, Society, or Board, which desires to use the Examination Papers of the Central Committee, must apply for the requisite forms on or before the 1st February, 1864, to the "Secretary of the Society of Arts."†

16. The Previous Examinations must be held by the Local Boards sufficiently early in the year 1864 to allow the results to be communicated to the Council on or before the 21st of March. The Form in which such communication is to be made will be furnished on application (see Form No. 2 in Appendix) and the required number of copies of Form No. 4 will be forwarded. These must be filled up and returned by the 28th March. If the papers issued by the "Central Committee" are used, the Examinations must be held on the days specified in paragraph 13.

Final Examination by the Examiners of the Society of Arts.

17. No candidate can be admitted to the Final Examination without a certificate (see Form No. 4 in Appendix) from a Local Board.

18. These Forms having been returned to the Secretary of the Society of Arts, by the 28th March, the printed papers of questions in the various subjects will be prepared by the Society's Examiners, and will be forwarded to the Secretaries of the Local Boards.

19. The whole of the papers appointed for each of the evenings of the Examination, according to the subjoined Time-table, with the required number of Forms of Declaration (Form No. 8), will be contained in a separate sealed envelope, which is not to be opened till the Candidates are present, at half-past six on that evening.

20. The details of the mode in which the Final Examination is to be conducted, are given in the "Letter of Instructions" (see Form No. 6 in Appendix), and every member of each Local Board should make himself thoroughly acquainted with them.

21. The Final Examination must be held *simultaneously on the days and at the hours specified in the following Time-table*, at those places where Local Boards are established.

22. In choosing the subjects in which they desire to be examined, candidates must take notice of the arrangements of this Time-table, as they *cannot* be examined in *two* subjects which are set down for the same evening.

TIME-TABLE FOR 1864.

No Candidate may work more than one paper on each evening, and each paper must be worked on the particular evening appointed for it.

Tuesday, 26th April, From 6.30 to 9.30 p.m.	Wednesday, 27th April, From 6.30 to 9.30 p.m.	Thursday, 28th April, From 6.30 to 9.30 p.m.	Friday, 29th April, From 6.30 to 9.30 p.m.
Arithmetic. Trigonometry. Magnetism, Electricity, and Heat. Agriculture. Mining and Metallurgy. Geometrical Drawing. German.	Book keeping. Navigation and Nautical Astronomy. Conic Sections. Chemistry. Music. Domestic Economy. English History.	Algebra. Practical Mechanics. Astronomy. Animal Physiology. Political and Social Economy. French. †English Literature.	Geometry. Mensuration. Principles of Mechanics. Botany. Geography. Latin. Logic and Mental Science. Freehand Drawing.

† Two Papers of one hour and a half each in this subject are considered as one.

23. The Local Boards must see, and certify to the Council, in the form which the Council will furnish (see Appendix, Form No. 8), that the papers are fairly worked by each candidate, without copying from any other, and without books or other assistance; and must seal up and return the worked papers to the Council *immediately* on the close of each evening's Examination. The papers will then be submitted to the judgment of the Examiners, and certificates of three grades will be awarded.

24. The names of the candidates who obtain Prizes and Certificates will be published in the *Journal of the Society of Arts*, as soon as the Examiners have pronounced their judgment, and the Prizes and Certificates will subsequently be forwarded to the Local Boards for distribution.

25. A candidate who has obtained from the Society a certificate of the 1st class in any subject, cannot again be examined in the same subject.

26. A candidate who has obtained a certificate of the 2nd or 3rd class may, on the recommendation of the Local Board, be examined in the same subject, in a subsequent year, without again passing the Previous Examination, but the name must always be returned in the proper form. (No. 4 in the Appendix.)

27. A candidate who, having obtained a certificate in any subject, desires to be examined in some other subject, in a subsequent year, may be "passed" by the Local Board, after examination in that subject, without re-examination in the elementary subjects.

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* As it is inconvenient for any central body to examine a large number of written answers, and undesirable that the responsibility of the Elementary Examinations should be taken out of the hands of the local authorities, a certain amount of diversity in the mode and result of the Elementary Examinations is inevitable, but this it is proposed to reduce to a *minimum* by attaching to special copies of the examination papers printed for the use of the examiners alone, the number of marks to be awarded for a complete answer to each question. For instance, suppose that in a paper there are twelve questions, and that the aggregate number of marks assigned to the paper is 120. The number of marks placed opposite to each question in the paper would of course depend upon its relative difficulty, and the proportion of these marks given by the examiner for the answer of any candidate would depend upon its accuracy and completeness. Thus, supposing a question perfectly answered to be worth 20 marks affixed in the examiner's copy, an examiner might award 20, 15, 12, or any less number, according to the merit of the answer. It is thought that in this way the candidates all over the country, though their papers be tested by different examiners, will be placed as nearly as possible upon an equal footing. It is further suggested that no candidate should receive a certificate who does not obtain at least 30 marks in *each* paper (the whole paper being worth 120 marks) *and* an aggregate of 150 marks in the three papers in which he is examined—that is to say, that 30 marks would be the minimum for a "pass" in any one subject, but that an average of 50 marks in each paper would be required to obtain a certificate, so that a candidate obtaining only 30 marks in one paper must obtain 60 in each of the others to obtain a certificate. The subjects of reading, writing, spelling, and needlework would still remain to be decided by the general impression in the minds of the examiners at the various centres, but it is not thought desirable to attempt to fix any number of marks as a standard of proficiency in these subjects. It is important that the same persons should examine *all* the candidates in any one subject of any of the several centres.

† In any case in which a Local Examining Body may examine candidates in the doctrines of Holy Scripture, in the Prayer Book, or in any other religious formulary, the results of such Examination may be stated, by that local Examining Body, on the certificate; though the Central Committee, representing a variety of opinions, does not itself provide for Examinations in religious doctrine. The "Metropolitan Association for Promoting the Education of Adults" announces that at its request the Bishops of London and Winchester have established collateral examinations in the Bible and Prayer Book, with certificates and prizes for those certificatees of that Association who may desire to undergo examinations in such subjects.

TERMS OF ADMISSION TO THE FINAL EXAMINATION.

28. Every Candidate for Examination must be admitted through a Local Educational Board connected with the Society of Arts, and be at least 16 years of age.

(*A.*) Members of, or students of classes in, Institutions in direct Union with the Society of Arts are admitted	Free.
(*B.*) Members of, or students of classes in, "Small Institutions"* not in direct Union with the Society of Arts, but connected with it through a Provincial Union or Local Board, are admitted on payment of a fee of ...	2s. 6d.
(*C.*) Persons of a higher class of society than those described in paragraph I. (Preliminary Notice), are admitted on payment of a fee of .	10s. 6d.

N.B.—The Council in every case leave it to the Local Board to decide whether a candidate should pay this fee.

29. Candidates coming under the head (*C.*), as well as Professional Teachers and Pupil Teachers, though they may be examined and receive certificates, cannot compete for the prizes of which details are given at page 642.

SUBJECTS FOR THE FINAL EXAMINATION IN 1864.

30. In the following paragraphs will be found brief outlines of the subjects in which the candidates will be examined, and their attention is especially drawn to this part of the programme, Though in most instances the Examiner has set down certain Text-books, in so doing he pronounces no opinion as to their merit. Real knowledge, however or wherever acquired, will be accepted by the Examiners.

⁂ N.B.—The paragraphs preceded by these asterisks are the remarks made by the Examiner in each subject on the papers worked by the Candidates in 1863.

I.—Arithmetic.

Examiner.—Rev. Alexander Wilson, M.A.

31. Practice—Simple and Compound Proportion—Interest—Discount—Insurance—Vulgar and Decimal Fractions; with the principles of a Decimal Notation in money on the basis of the pound unit.

32. The questions framed from the preceding syllabus will consist mainly of practical problems, and the Examiner will take into account not only the correctness of the answers, but also the excellence of the methods by which they are worked out, and the clearness and neatness of working, *which must always be shown.*

33. Text Books:—Any of the modern treatises on Arithmetic, such as Hunter's Text Book (*National Society*), Colenso (*Longmans*), or Barnard Smith (*Macmillan*).

⁂ "The marked improvement which I mentioned in connection with the papers of last year is fully sustained by those which have been sent in for the present Examination. The mechanical portion of the work has, in general, been very neatly and clearly done; while the solutions of the various questions show a highly commendable amount of skill and intelligence."

II.—Book-keeping by Double Entry.

Examiner.—John Ball, Esq.

34. Candidates should be prepared to answer questions as to the nature and use of the different books usually kept n a merchant's office. They should be prepared to journalize a series of transactions from a waste book, and, having posted the entries to the ledger, to balance the accounts, to prove the correctness of the postings by a trial-balance, and finally to exhibit an account of profit and loss, and a balance sheet.

35. Candidates should be prepared to draw the usual commercial forms, such as receipts, bills of exchange, promissory notes, invoices, account sales, accounts current, bills of parcels, and to explain the meanings of technical terms used in general business.

36. Text Books:—
Rudimentary Book-keeping (*Weale's Series*).
Kelly's Elements of Book keeping (*Simpkins and Co*).
Examination-Questions in Book keeping by Double Entry, by the Rev. J. Hunter, M.A. (*Longmans and Co*).

⁂ "The number of candidates this year is higher than on any former occasion; but the average quality of the work performed is not high—neither absolutely nor as compared with the work of former years; and notwithstanding the exhibition of much careful labour, and of some excellent results, the prevailing characteristic of the year's product in this department is mediocrity."

III.—Algebra.

Examiner.—J. J. Sylvester, Esq., M.A., F.R.S.

37. Elementary Operations and Fractions. Simple and Quadratic Equations and Problems leading to them. Involution and Evolution. Surds. Arithmetical and Geometrical Series. Combinations and Permutations. Binomical Theorem.

38. Text Books:—Todhunter's Algebra (*Macmillan*), Colenso's Algebra (*Longmans*), Lund's, or any other modern treatise on Algebra.

⁂ "Of the 81 candidates, three may be selected as evincing a considerable degree of mathematical power—others show very good ability. In all, thirteen have obtained first-class certificates; twenty-eight, second-class certificates; twenty-eight, third-class certificates; and twelve have failed. The general character of the answering has been creditable."

IV.—Geometry.

Examiner.—Rev. B. Morgan Cowie, M.A.

39. A facility in solving geometrical theorems and problems, deducible from the first six books of Euclid, will be expected on the part of those who desire to obtain certificates of the first or second class.

40. Text Book:—Euclid, Books I., II., III., IV., VI., XI., as far as Prop. 21; Pott's smaller edition (*Parker*).

⁂ "The general character of the papers I have xamined is satisfactory; more of the candidates than heretofore have shown some power of solving problems; and, generally, the appreciation of the strict logical method is shown by the accuracy of most of the answers, even when few in number."

V.—Mensuration.

Examiner.—John Sykes, Esq., M.A.

41. The calculation of the areas and circumferences of plane figures bounded by arcs of circles or right lines, and

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*** Small Institutions are defined as those which have an income of less than £75 a year.**

solid contents of cones, cylinders, spheres, &c. Candidates will be expected to be familiar with the different rules for measuring and estimating artificers' work, such as joiners', bricklayers', masons', and plumbers' work, and to be able to prepare estimates of such work from given quantities.

42. Text Books:—Lund's Mensuration, Part III., of his Elements of Geometry and Mensuration. Tate's Mensuration. Young's Treatise on Mensuration (*Simms and M'Intyre*).

⁂ "The papers have not been so well done as last year. No candidate has obtained more than two-thirds of 'full marks,' and the number 'not passed' is larger than it ought to be. In some instances the Preliminary Examinations must have been very elementary. In all cases the work by which the results are arrived at should be sent up. It is not necessary that it should be scrupulously neat, or that the rough work should be carefully transcribed."

VI.—Trigonometry.

Examiner.—Rev. T. G. Hall.

43. In Plane Trigonometry, the formulæ for the trigonometrical functions of the angles, the numerical solution of plane triangles, the use of logarithmic tables, and angular and experimental series.

44. Spherical Trigonometry, Napier's Rules, Solution of Spherical Triangles.

45. Text Books:—Snowball's or Todhunter's Trigonometry, Hall's Trigonometry for Schools (*Christian Knowledge Society*), or any other of the modern treatises on Trigonometry. Mathematical Tables (*Chambers' Series*).

⁂ "The number of candidates continues to be small. Those examined this year passed very creditably—as none exhibited any glaring errors. Of the questions proposed, all but one was successfully attempted."

VII.—Conic Sections.

Examiner.—Rev. Bartholomew Price, M.A. F.R.S.

46. The properties of the three curves treated geometrically; also as deduced from the cone. The principles of projection, orthogonal and central, applied to derive the properties of the Conic Sections from those of the circle.

47. Analytical Conics, including the equations of the straight line, the circle, the three conic sections, and the general equation of the second degree.

48. Text Books:—Puckle's Conic Sections (*Macmillan*). Todhunter's Conic Sections (*Macmillan*). Salmon's Conic Sections (*Longmans*). Drew's Conic Sections (*Macmillan*). Whewell's Conic Sections (*Parker*).

⁂ "The number of candidates who have answered the questions in Conic Sections is still very small. The work, however, is so good that I cannot recommend the omission of the subject. It is evident that considerable thought and study have been bestowed on it; and this cannot be without great benefit to the candidates."

VIII.—Navigation and Nautical Astronomy.

Examiner.—Rev. Joseph Woolley, LL.D.

49. A good knowledge of Plane and Spherical Trigonometry, of the definitions and terms used in Nautical Astronomy, and of the various measurements of time and their mutual conversions will be required, as well as skill in the use of logarithmic tables, and neatness, order, and accuracy in the numerical solutions of problems. The candidate should understand the construction of charts; the nature and laws of circular storms; great circle sailing, &c.; the methods of determining the latitude, longitude, variation of the compass, and error and rate of a chronometer by astronomical observations, with the demonstrations of the formulæ employed; the use of Nautical Astronomical Instruments, &c.

50. Text Books:—The Nautical Almanac (*Murray*). Riddle's Navigation and Nautical Astronomy (*Law*, Essex-street).

⁂ "The number of candidates in these subjects is very small. They all of them show an intelligent knowledge of the principles and of their application. They, however, want accuracy in taking out data from the tables and Nautical Almanac. Candidates cannot be too strongly impressed with the truth that in working examples in these subjects accuracy is everything. The small degree of interest excited by these—to a maritime country like ours—vital subjects, as shown by the paucity of candidates at these examinations, is distressing. Those who will be charged with the duty of navigating our ships seem too easily satisfied with acquiring a knowledge of mere rules, without enquiring into the principles on which they are grounded. Such knowledge must needs be partial and devoid of interest. The navigation schools in the United Kingdom are furnished with a staff of teachers thoroughly competent to instruct both in theory and practice, and it is much to be hoped that the fruits of their labours may become more apparent than they seem hitherto to have been."

IX.—Principles of Mechanics.

Examiner.—Rev. Jonathan Bates, M.A.

51. The properties of matter, solid, fluid, and gaseous.

52. Statics: The composition, resolution, and equilibrium of pressures acting on a material particle; and on constrained particles; machines; attractions.

53. Dynamics; the laws of motion; impact; projectiles; constrained motion; central forces; oscillation.

54. Rigid Dynamics: Motion of a rigid body about a point;—of a free rigid body;—of a system of rigid bodies.

55. Hydrostatics: Pressures of fluids; equilibrium of floating bodies; specific gravity; elastic fluids; machines; temperature and heat; steam; evaporation.

56. Hydrodynamics: Motion and resistance of fluids i tubes, &c.; waves and tides.

57. Pneumatics: Mechanical properties of air; the barometer, and other machines illustrating the mechanical properties of air.

58. Text Books:—Todhunter's Statics, or Parkinson' Mechanics. Goodwin's Mathematics. Miller's, Phear's, or Webster's Hydrostatics. Webster's Theory of Fluids. The treatise on this subject in Orr's Circle of the Sciences. Golding Bird's Elements of Natural Philosophy, by C. Brooke (*Churchill*). Lardner's Handbooks on Natural Philosophy.

⁂ "Again it is my very pleasing duty to be able to report considerable improvement in the papers submitted to my notice. They are especially marked, on this occasion, by evidences of considerable acquaintance with the subjects of examination. Still I am desirous to impress upon all the candidates the necessity of seeking after greater perspicuity and method in the arrangement of their replies to the questions proposed by the Examiner, inasmuch as such an acquirement not only counts for much in an examination, but must be of great service in all their subsequent commercial or professional pursuits."

X.—Practical Mechanics.

Examiner.—T. M. Goodeve, Esq.

59. The Applications of the Principles of Mechanism to Simple Machines. The Steam Engine.

60. Text Books:—Bourne's Catechism of the Steam Engine (*Longmans*). Scott Russell on the Steam Engine. Nasmyth's Elements of Mechanism, with remarks on Tools and Machinery (*Weale*). Goodeve's Elements of Mechanism (*Longmans*).

⁂ "The papers are of very fair average merit, and those candidates who have experienced a disappointment in not obtaining the higher distinctions, will understand that without careful reading and study it is impossible to master the intricacies of this subject."

XI.—Magnetism, Electricity, and Heat.

Examiner.—Charles Brooke, Esq., M.A., F.R.S.

61.—Construction and Properties of Magnets; Magnetic Instruments; Terrestrial Magnetism; Diamagnetism.

62. Statical or Franklinic Electricity; Voltaic Electricity; Electro-dynamics; Electro-telegraphy; Electro-metallurgy; Thermo-Electricity; Organic Electricity.

63. Conduction, Convection, and Radiation of Heat; Instruments for measuring Heat; Specific and Latent Heat; Reflection and Refraction of Heat; Diathermancy.

64. Text Books:—Golding Bird's Elements of Natural Philosophy, by C. Brooke (*Churchill*). Lardner's Handbooks of Natural Philosophy (*Walton and Maberly*). Fleeming Jenkin's report on the Electrical Instruments in Class XIII. of the Exhibition of 1862, for Electro-telegraphy. Herschel's Discourse on the Study of Natural Philosophy (*Longmans*) for a *general* view of the subjects.

⁂ "I am happy to be able to record on the present occasion a very satisfactory progress in the study of these subjects, as shown by the increased number of candidates, and by the general character of the answers. A suggestion contained in the last report, as to the value and importance of the more practical bearings of these subjects, appears to have been not unfruitful; still electro-telegraphy does not receive the attention from students that its political and commercial importance demands. This may in some degree be due to the want of a good elementary treatise on the subject; a want that will be in a great measure satisfied by the able report of the present state of that science by Mr. Fleeming Jenkin, comprised in the Jury Report of Class XIII., in the recent International Exhibition."

XII.—Astronomy.

Examiner.—James Glaisher, Esq., F.R.S.

65. The principles of Plane Astronomy.

66. Text Books:—Herschel's Astronomy (*Longmans*); first chapters. Airy's Lectures on Astronomy. Maddy's Elements of Astronomy. Practical Astronomy (Orr's Circle of the Sciences).

⁂ "The papers this year are different from those of any preceding year. They show a somewhat extensive, and in some respects, careful reading, but they are almost totally deficient in practical application, and no attempt was made of investigation of formulæ. So far as the Examiner is able to infer, it would seem that the candidates' acquired knowledge of Astronomy has not been based upon Geometry and Trigonometry, and consequently they are unable, from the want of mathematical training, notwithstanding that they seem to have read some Algebra, to express geometrically the knowledge they have acquired, and hence the cause of the failure of practical application. He advises future candidates to study Geometry well, it will enable them to understand their work better than confining themselves to analytical reading."

XIII.—Chemistry.

Examiner.—A. W. Williamson, Esq.

67.—Inorganic. Chemistry of the metalloids and metals, laws of combining proportions, volumes of gases, vapours, &c. Organic. Composition, properties, and decompositions of alcohols, acids, &c.

68. Candidates are expected to be able to explain decompositions by the use of symbols. Questions illustrative of general principles will be selected from the following, amongst other manufactures: Metallurgy of Lead, Iron, and Copper; Bleaching, Dyeing, Soap-boiling, Tanning; the manufacture of Coal-Gas, Sulphuric Acid, &c.

69. Text Books:—Fownes' Manual of Elementary Chemistry. Miller's Elements of Chemistry.

⁂ "The large proportion of first class certificates awarded is an evidence of the generally high character of the answers, and I observe with particular satisfaction that those questions which relate to combining proportions by weight, or by volume, are better answered than on previous occasions. The least commendable answers are generally those relating to analytical operations, and the great majority of the candidates would be much benefited by the practical teaching of the laboratory."

XIV.—Animal Physiology in relation to Health.

Examiner.—John Marshall, Esq., F.R.S., F.R.C.S.

70. The general principles of Animal Physiology, and the application of them to the preservation of health and to the wants and energies of daily life.

71. Text Books:—Carpenter's Animal Physiology, 1859 (*Bohn*). Lardner's Animal Physics (*Walton and Maberly*). Translation of Milne Edwards' Manual of Zoology (*Renshaw*). Marshall's Description of the Human Body, with Atlas (*Day and Sons*), for details of Anatomy.

⁂ "I am glad to be able to record a decided improvement in the character of the papers as compared with those of last year. It is satisfactory to find that the applications of Physiology to the preservation of Health, have evidently attracted the attention of the candidates; but it is necessary for them ever to bear in mind that accuracy of scientific knowledge must after all be the test in an examination. I mention this because some who have written most have not always written best. I am glad to find a smaller number of immature students in this year's list than there were last year."

XV.—Botany.

Examiner.—Daniel Oliver, Esq., F.R.S., F.L.S.

72. Sect. I. Vegetable Physiology. The general Structure of a Plant. The manner in which the organs perform their several functions; and the influence exercised by external agents. The nature of their principal tissues. The application of such facts to practical purposes.

73. Text Books:—Lindley's Theory and practice of Horticulture (*Longmans*); or the same author's School-Botany, the edition of 1854, or any later one. (*Bradbury and Evans.*)

74. Sect. II. Practical Botany. The meaning of Botanical Terms. The general facts relating to Botanical Classification, excluding that of Linnæus. The Distinctions of some of the principal English Natural Orders of Plants *not* Cryptogamic. Naming Plants not Cryptogamic at sight. The art of describing Plants correctly. (For this living specimens will be provided.)

75. Text Books:—Lindley's School Botany and Descriptive Botany (*Bradbury and Evans*).

76. Candidates will be expected to return four correct answers to questions in Sect. I., and six in Section II.; each Botanical description standing for one answer. The

questions in both sections will have reference exclusively to subjects having some practical application. Students are earnestly recommended to practice as much as possible the art of describing plants correctly, and precisely in the manner required by the great Linnæus, whose method is fully explained in "Descriptive Botany," now forming a part of "School Botany." They should also apply themselves diligently to the study of the wild or common hardy garden plants to which they may have access. A knowledge of Field Botany will rank much higher with the Examiner than mere Botany picked up in books.

⁂ "Answers have been sent up from but three candidates. They are all very fair and indicate considerable acquaintance with both theoretical and practical botany. None of them, however, attempt to describe the ovary and fruit of the oak and hazel, and none correctly distinguish rye from barley. I return one in the second, two in the third class."

XVI.—Agriculture.

Examiner.—J. C. Morton Esq.

77. Half-a-dozen questions will be put on each of the three principal departments of Agriculture, viz :—(1) The tillage, drainage, and manuring of the soil; (2) The cultivation of plants; (3) Live-stock management and the meat-manufacture. A certificate will be easily obtained by any one able to direct the labour of the farm, who has been accustomed to consult any of the standard works on English Agriculture.

⁂ "The single paper submitted indicates knowledge derived from books rather than experience, and is imperfect accordingly."

XVII.—Mining and Metallurgy.

Examiner.—J. Arthur Phillips, Esq.

78. Candidates should be able to identify with facility the ores of the more common metals, and be acquainted with their chemical composition. They should also be familiar with the forms of occurrence of the various metallic ores, and the usual methods employed for their extraction and subsequent purification by crushing, stamping, and washing, &c. Underground surveying, principles of ventilation, particularly as applicable to collieries. A knowledge of furnace assaying, and a general acquaintance with the metallurgy of the more important metals.

79. First-class certificates can be given to those only who have either acquired some practical knowledge of mining, or who possess a special acquaintance with the metallurgy of at least one of the useful metals.

80. Text Books :—Dana's Mineralogy (*Trubner and Co.*, Paternoster-row). Mitchell's Assaying (*Baillière*). Manual of Metallurgy (*Griffin*). Useful Metals and their Alloys (*Houlston and Wright*). Ure's Dictionary of Arts, Manufactures, and Mines (*Longmans*). Percy's Metallurgy (*Longmans*). Metallurgy of Iron, Truran (*Spon*).

⁂ "No. 327 is an excellent paper, and the writer is evidently well acquainted with the subject. None of the others exhibit a degree of excellence worthy of special remark."

XVIII.—Political and Social Economy.

Examiner.—Charles Neate, Esq., M.A.

81. Text Books :—Adam Smith (M'Culloch's edition). Principles of Political Economy, by John Stuart Mill.

82. Some knowledge of the Commercial, Financial, and Statistical History of the United Kingdom will be required, for which "Porter's Progress of the Nation," "M'Culloch's Commercial Dictionary," and Merivale's Lectures on Colonisation and the Colonies" (new edition) may be consulted.

N.B.—The Principles of Political Economy, by John Stuart Mill, need be studied only by those who aspire to a first-class certificate.

⁂ "With the one rather remarkable exception, which placed in the first class, none of the candidates appear to have studied to any purpose the subjects included under the head of Political Economy."

XIX.—Domestic Economy.

Examiner.—The Very Rev. Richard Dawes, F.R.S., Dean of Hereford

83. By this is meant a knowledge of the management of household matters, and the principles on which they are conducted; the "why and the wherefore" of everything under this head. For instance as regards food, animal and vegetable, how differing in nutriment, &c., cookery, &c.

84. Clothing of various kinds, how best fitted for varying climates, seasons, and occupations, &c.

85. The Sanitary regulations of the house, such as ventilation, warming and lighting, drainage, &c. A knowledge of the weights and measures by which the prices of provisions, &c., are regulated; in fact, how to make the most of a small income.

86. A knowledge also of the principles of the Savings-Bank, and of the accumulation of small savings, of the Benefit Society, of present and deferred annuities.

87. Text Books :—A Manual of Domestic Economy, by Tegetmeier (*Home and Colonial School Society*).

Household Economy, by Margaret Brewster (*Constable and Co.*)

Domestic Economy, by Esther Copley (*Groombridge and Son*).

⁂ "The number examined in this subject is again a small increase upon the preceding year; and, although only one has reached the first class, the greater part of them have shown a creditable knowledge of the subject, which may be of use to them in after life."

XX.—Geography.

Examiner.—William Hughes, Esq., F.R.G.S.

88. All candidates will be expected to possess a sound knowledge of Elementary Geography, both physical and descriptive. Such knowledge will of necessity embrace an acquaintance with at least the outline of the great natural features of the globe, the political divisions of countries, and the localities of towns and other places of importance. This kind of knowledge will be looked for in fuller extent with regard to the British Islands, and the various portions of the British Empire, than in respect of other countries. The growing importance of the colonial dependencies of Britain renders a knowledge of their geography more than ever necessary in the present day. The North American and Australian colonies of Britain are hence proposed as a subject for more especial study on the part of the intending candidates for the ensuing year's examinations, and their attention is directed to them accordingly. In evidence of the knowledge possessed regarding those regions, the candidate will be required to sketch, from memory, a map of any one of the North American or Australian colonies that may be named by the examiner. It will not of course be expected that such sketches should possess accuracy of detail, but they should at least show the general direction of coast-lines, mountain-chains, or river-courses, with the localities and names of the principal towns.

89. In addition to the above, candidates who aim at the highest class of certificate should be prepared to answer questions bearing upon Geography in its relation to the Physical Sciences and the History of Mankind—such questions, that is, as involve a general acquaintance with the subject of Climate, the laws of Meteorology, the Distribution of Plants and Animals over the Globe, the leading outlines of Geology, the Ethnographic Division of the Human race, and the commercial resources of different lands. This kind of knowledge is looked for, not in place of geographical knowledge of a more elementary kind, but as supplementary to it, and throughout based upon it.

90. Text Books:—

Manual of Geography, by William Hughes (*Longmans*).

Guyot's Earth and Man (*Parker and Son*).

Physical Geography, by Sir John F. W. Herschel (*A. and C. Black*).

Page's Introductory Text Book of Geology (*Blackwood*).

The General Atlas (*Published by the National Society*).

The School Physical Atlas (*either Johnstone's or that published by the National Society*).

⁂ "The impression which I derive from the Examination papers of this year is favourable to the industry of the candidates. The number of failures is fewer than upon some former occasions. But it is from the evidence supplied in a large majority of the answers, of patient and thoughtful labour bestowed upon the effort to master the less attractive details of the subject, that I chiefly form my conclusions. Comparing them with my recollections of former examinations, the papers shew a clearer appreciation on the part of the writers of the meaning and purpose of geography, and a fuller determination to pay regard to its humbler elements in preference to indulgence in the mere generalities which often assume a more seductive aspect to the learner. The advance made in this regard is altogether in the right direction."

XXI.—English History.

Examiner.—C. H. Pearson, Esq., M.A.

91. English History and English Constitutional History.

Text Books:—The Student's Hume. Creasy's Rise and Progress of the English Constitution.

92. Special subject:—The Reign of Charles II.

Text Book:—The chapters relating to this subject in Lingard's History of England.

⁂ "The papers are below the average of former years, both in the number of those that deserved to be placed high, and in the quality of those that were best comparatively. One great cause of this was that very few students had prepared their work out of the text-books recommended, and 'Creasy's Growth of the English Constitution' had been specially neglected. This omission to prepare a subject set, of course told seriously against all who had been guilty of it. Candidates will do well to remember that the object of the Examination in History is not merely to elicit a knowledge of names, or dates, and perhaps of a few trivial stories, but to test the writer's power of understanding past times as he understands his own. In such a book as the 'Student's Hume' the succession of events is given; in 'Creasy,' the structure of the Constitution is explained, with special reference to its gradual development; and as a man who knows one subject fairly well is alive to his own deficiencies in other matters, the study of a special period in some more elaborate work than a manual is always recommended. The whole benefits of this plan are lost if the Candidate confines himself to one book. Some even appeared to have prepared their work from some text-book of a slighter character than the 'Student's Hume.'"

XXII.—English Literature.

Examiner.—Rev. Samuel Clark, M.A., F.R.G.S.

93. Any two, but not more than two, of the authors in the following list may be taken up for examination:—

Chaucer.—The Prologue to the Canterbury Tales.

Shakspere.—King Lear; Richard II.; The Merchant of Venice.

Bacon.—Essays.

Craik.—Outlines of the History of the English Language..

94. Candidates are recommended to make a very careful study of the text of the authors they may select. The questions on each author will be divided into two sections, the first intended to test the candidate's acquaintance with the text, the next his knowledge of the subject-matter and his critical and literary information. Full marks will not be given for answers in the second section, if those in the first section do not prove satisfactory.

⁂ "No one of the candidates is equal to the best of last year, but the average is not inferior. An increasing tendency has shown itself in the candidates, during the last four years, to prefer the papers on Shakespeare and Milton, and that on the English language."

XXIII.—Logic and Mental Science.

Examiner.—J. F. Ferrier, Esq., LL.D.

95. Logic: Candidates will be expected to answer questions on the different processes of thought, and on the connexion of thought and language. Every Candidate must attempt to analyse examples of reasoning, and to detect fallacies.

96. Text books:—Whateley's Elements of Logic, or Thomson's Outline of the Laws of Thought.

97. A Candidate for a second or third-class Certificate will be expected to prepare, in addition, any one of the following books which he may select:—Mill's System of Logic, Book III., of Induction; Bishop Butler's Sermons; Paley's Moral Philosophy; Dugald Stewart's Philosophy of the Human Mind, Volume I.

98. A Candidate for a first-class Certificate will be expected to prepare any two of these works which he may select.

⁂ "In logic, with scarcely an exception, the candidates have acquitted themselves creditably; but they are not so well prepared on the books which they professed. On the whole the examination has been satisfactory; indeed, highly so, when the very rare cases of failure are considered."

XXIV.—Latin and Roman History.

Examiner.—Rev. F. Temple, D.D.

99. Sallust. Bell. Cat.

Virgil. Æneid, Book vi.

Roman History to the death of Augustus Cæsar.

100. Text Book:—Liddell's History of Rome in one volume.

⁂ "The work, on the whole, is not so good as it was last year. The parsing is perhaps a little better, but the translations are inferior, and the history still more so."

XXV.—French.

Examiner.—Alphonse Mariette, Esq., M.A.

101. The Examination paper will be divided into three parts.

102. The first will comprise grammatical questions and an extract from a modern French writer to be translated

into English. Candidates aiming at a 3rd class certificate should confine themselves to this first part.

103. The second part will comprise an English extract to be translated into French, and a list of idiomatic expressions to be rendered from French into English, or *vice versâ*. This should be done satisfactorily by the candidate who aims at a 2nd class certificate.

104. In the third part, candidates for a 1st class certificate will have, in addition to a portion of the above, to answer properly (*in French*) some *elementary* questions on the two following subjects:—

1. French literature in the second half of the 17th century, comprising the great writers who were born between the years 1620 and 1650 from (Molière to Fénélon).

2. The History of France, from the Revocation of the Edict of Nantes to the death of Louis XIV. (1685-1715).

105. Books recommended:—Nisard: Histoire de la Littérature Française (*Williams and Norgate*, London and Edinburgh), or Barrère, Ecrivains Français (*Williams and Norgate*). Duruy: Histoire de France (*Williams and Norgate*).

⁂ "I am not quite so satisfied this time with the French papers as I was last year. True, as compared with the results of four or five years ago, we are still considerably in advance, and the proportion of candidates entitled to certificates is quite as large this year, I think, as it has ever been; but the first class papers are very few, and even in those the literature and history bear decided marks of *cramming*, being wanting in originality of thought and freedom of style; whilst the translation from English into French is very unsatisfactory."

XXVI.—German.

Examiner.—Dr. Bernays.

106. Schiller's Geschichte des Abfalls der Niederlande.
Schiller's Maria Stuart.
Göthe's Tasso.
Kohlrausch's Deutsche Geschichte.

107. Pieces from each of the above works will be given for translation, at the choice of the candidate. Every candidate must translate one piece. First-class certificates will be given to those only who translate *well* from English into German, and write in German a well-expressed Essay on a subject which will be announced to them when they come up for examination.

⁂ "There is a decided improvement in the work upon former years. The translations from German into English were in nearly all the papers excellent; and those from English into German very promising. The weakness appeared in the composition, and the majority of candidates ventured upon writing an essay when they ought to have contented themselves with answering more of the questions, by which they would have obtained marks which they could not earn by a feeble composition."

XXVII.—Freehand Drawing.

Examiner.—F. S. Cary, Esq.

108. In freehand drawing the Candidate will be required to show a practical knowledge of the principles usually applied in the imitation of natural and artificial forms, such as furniture, manufactured articles, ornament, foliage, and the human form,

⁂ "The number of candidates in this subject has been gradually increasing at each successive examination; this time the number greatly exceeded that of any former year. When the examinations were first commenced there were less than twenty candidates for two or three years; this year between seventy and eighty have sent in drawings. This great increase in the numbers is highly satisfactory, being a proof of the value that is set upon the certificates of the Society of Arts as well as showing how much drawing, as a useful art, is spreading throughout the country. Last year the drawings were better than those of any previous year, and I am glad to be able to say they have not fallen off on the present occasion."

XXVIII.—Geometrical Drawing.

Examiner.—Thomas Bradley, Esq.

109. Practical Geometry, or Geometrical Drawing, required by the Mechanist, Engineer, Builder, and all in any way employed in the art of construction. The Candidate will be examined in Practical Plane Geometry, the construction of right line figures of given areas, and of curve lines required in the arts, &c.; in Practical Solid Geometry, Elementary Problems on the line and plane, and their combinations, the representation by orthographic projection of simple solids from conditions, and in the principles of Development as used in the construction of Maps, &c.; and in Elementary Perspective Projection as far as it is required by the Architect.

110. Text Books:—Geometry, Plane, Solid, and Spherical (*Library of Useful Knowledge*) is especially recommended as a work to be studied on Theoretical Geometry. —Elements of Geometrical Drawing, published by the Committee of Council on Education, 2 parts (*Chapman and Hall*).—Hall's Elements of Descriptive Geometry for Students in Engineering. Heather's Descriptive Geometry. Also the following French Works, which are mentioned in consequence of the great deficiency in English Works on Geometrical Drawing:—Elémens de Géométrie Descriptive, par S. F. Lacroix; Traité de Géométrie Descriptive, par Lefebure de Fourcy; Nouveau Cours raisonné de Dessin Industriel, par Armengaud, aîné, et Armengaud, jeune, et Amouroux; Bardin's Works on Descriptive Geometry.

⁂ "Misled, perhaps, by the title 'Geometrical Drawing,' the candidates appear to be not yet aware of what is expected from them. 'Practical Geometry' implies more than the application of simple deductions from the six books of 'Euclid.' The draughtsman must be able not only to draw a circle through three given points, but to determine and draw a sphere which has four given points on its surface. The constructions required by the examination paper did not require so much as this very elementary knowledge, and yet few have succeeded. There is, however, a perceptible improvement manifested in knowledge of Plane Geometry, and in neat accurate drawing."

XXIX.—Theory of Music.

Examiner.—John Hullah, Esq.

111. Notation, the modern modes, intervals, time signatures, the stave, transposition, modulation, terms and characters in common use.

112. The Elements of Harmony.

113. Musical History and Biography.

114. Arrangements must be made, in the Previous Examination by the Local Boards, to test Candidates, by oral examination, in their knowledge or appreciation of the *sound* of musical successions and combinations. A form of the test to be used for this purpose by the Local Board at the Previous Examination will be sent by the Council to such Local Boards as may *apply for it*, in due time before the Examination.

⁂ "The best papers of this year are, I think, inferior to the best of last year; but the number of fairly good ones is certainly greater. It would seem that the higher branches of Musical Theory do not find an increasing number of students among our candidates, but that the rudiments are much more carefully taught than heretofore."

PRIZES FOR 1864.

THE PRINCE CONSORT'S PRIZE.

115. His Royal Highness the late President of the Society was pleased to offer annually to the candidate who, obtaining a certificate of the first class in the current year, shall have obtained in that year and the three years immediately preceding it, the greatest number of such certificates, a Prize of Twenty-five Guineas, and this Prize Her Majesty the Queen has graciously intimated her intention to continue. This Prize cannot be taken more than once by the same candidate. It will be accompanied by a certificate from the Society of Arts, setting forth the special character of the Prize, and the various certificates for which it was granted.

GENERAL PRIZES.

*** No Prize in any subject will be awarded to a Candidate who does not obtain a Certificate of the first-class therein.

1. Arithmetic	First Prize, £5. Second Prize, £3.
2. Book-keeping ...	First Prize, £5. Second Prize, £3.
3. Algebra	First Prize, £5. Second Prize, £3.
4. Geometry	First Prize, £5. Second Prize, £3.
5. Mensuration... ...	First Prize, £5. Second Prize, £3.
6. Trigonometry ...	First Prize, £5. Second Prize, £3.
7. Conic Sections ...	First Prize, £5. Second Prize, £3.
8. Navigation and Nautical Astronomy...	First Prize, £5. Second Prize, £3.
9. Principles of Mechanics	First Prize, £5. Second Prize, £3.
10. Practical Mechanics.	First Prize, £5. Second Prize, £3.
11. Magnetism, Electricity, and Heat ...	First Prize, £5. Second Prize, £3.
12. Astronomy	First Prize, £5. Second Prize, £3.
13. Chemistry	First Prize, £5. Second Prize, £3.
14. Animal Physiology (in relation to Health).	First Prize, £5. Second Prize, £3. Additional by Gift of Harry Chester, Esq.:— Third Prize, £2, and Three Prizes of Books, value £1 each.
15. Botany	First Prize, £5. Second Prize, £3.
16. Agriculture	First Prize, £5. Second Prize, £3. Additional by Gift of J. C. Morton, Esq.:— Third Prize, £2, and Three Prizes of Books, value £1 each.
17. Mining and Metallurgy	First Prize, £5. Second Prize, £3. Additional by Gift of Sir Thomas Phillips, F.G.S.:— Third Prize, £2, and Three Prizes of Books, value £1 each.
18. Political and Social Economy... ...	First Prize, £5. Second Prize, £3.
19. Domestic Economy...	First Prize, £5. Second Prize, £3.
20. Geography	First Prize, £5. Second Prize, £3.
21. English History ...	First Prize, £5. Second Prize, £3. Additional by Gift of Sir C. Wentworth Dilke, Bart. Third Prize, £2; and Three Prizes of Books, value £1 each.
22. English Literature ...	First Prize, £5. Second Prize, £3. Additional by Gift of Sir C. Wentworth Dilke, Bart.:— Third Prize, £2; and Three Prizes of Books, value £1 each.
23. Logic and Mental Science	First Prize, £5. Second Prize, £3.
24. Latin and Roman History	First Prize, £5. Second Prize, £3.
25. French	First Prize, £5. Second Prize, £3.
26. German	First Prize, £5. Second Prize, £3.
27. Freehand Drawing...	First Prize, £5. Second Prize, £3.
28. Mechanical Drawing.	First Prize, £5. Second Prize, £3.
29. Theory of Music ...	First Prize, £5. Second Prize, £3.

LIST OF LOCAL EDUCATIONAL BOARDS.

The following is a List of the places at which Local Boards have already been formed, with the names of the Secretaries, from whom intending Candidates and others may obtain information relative to the Examinations:—

Local Boards.	Secretaries.
Aberdeen	Mr. James Sinclair, Mechanics' Institution, Aberdeen.
Accrington	Mr. H. G. Duffield, Accrington.
Airdrie School of Arts, and Mechanics' Institution.	Mr. Boyd M. McCrae, Airdrie.
Aldershot and Farnham District	Mr. Barrow Rule, M.C.P., Principal of the Classical and Mathematical School, Aldershot.
Ashford	Mr. F. Garaway, Schoolmaster, Ashford New Town.
Bacup	Mr. Thos. Newbigging, Bacup.
Banbridge (Ireland) Literary and Mutual Improvement Society	Mr. Alexander Black, Banbridge, County Down, Ireland
Banbury	Mr. John H. Beale, Banbury.
Barnet	Mr. John Thimbleby, Barnet.
Belfast	Rev. Wm. C. McCullagh, Ballysillan, Belfast.
Birmingham and Midland Institute	Mr. Thos. Martineau, Solicitor, Cannon-st., Birmingham.
Bishop's Stortford	Mr. F. Woodham Nash, B.A., Sion House, Birchanger, Bishop's Stortford.
Blackburn	Mr. William Gourlay & Mr. J. H. Margerison, Blackburn.
Blandford	Mr. Jas. B. Green, Architect and Surveyor, Salisbury-street, Blandford.
Bradford	Mr. D. J. Crebbin, Schoolmaster, Chapel-street, Bradford.
Brighton (for Sussex)	Mr. Barclay Phillips, 75, Lansdowne-place, Brighton.
Bristol	Mr. J. F. R. Daniel, Athenæum, Bristol.
Brompton (near Chatham)	Mr. J. Greenleaf, 8, Prospect-row, Brompton, Chatham.
Bucks and Berks Adult Education Society, Windsor	Rev. Thomas Rooke, M.A., St. Alban-street, Windsor.
Bury (Lancashire)	Mr. Edmund Bunting, Athenæum, Bury.
Bury St. Edmund's	Mr. John Jackson, Head Master of the Commercial School, Bury St. Edmund's.
Canterbury	Rev. Edward Gilder, M.A., Canterbury.
Carlisle Church of England Association	Mr. Thos. Harris, Stationer, 51, Castle-street, Carlisle.
Carlisle Mechanics' Institute	Mr. W. A. Williamson, Mechanics' Institute, Carlisle.
Chelmsford	Mr. W. Cutts and Mr. Jesse Garrood, Chelmsford.
Croydon	Mr. Francis Warren, Bookseller, 131, High street.
Darlington	Mr. Geo. S. Gibbs, Haughton-le-Skerne, Darlington.
Deptford	Mr. Thomas Earland, 2, Wellington-grove, Greenwich-road, S.E.
Derby	Mr. H. M. Holmes, Hon. Local Sec. to the Society of Arts, London-road, Derby.
Devonport	Mr. Wm. Mogg and Mr. Samuel Chapple, Mechanics' Institute, Devonport.
Farsley (near Leeds) Mechanics' Institution (Yorkshire Union)	Mr. James Cockshott, Grocer, Farsley, near Leeds.
Faversham	Mr. Frederick W. Monk, Managing Director of the Faversham Institute.
Gilford (Ireland) Young Men's Mutual Improvement Society	Dr. Henry McBride, M.D., Gilford, Co. Down, Ireland.
Glasgow Athenæum	Mr. Moses Provan, Accountant, 110, West George street, Glasgow.
Glasgow Institution	Mr. John Craig, F.E.I.S., Glasgow Institution, 37, Cathedral-street, Glasgow.
Glasgow Mechanics' Institution	Mr. Robert McIntyre, Director, &c., 105, South Portland-street, Glasgow.
Glasgow Popular Evening Classes, Andersonian University	Mr. George Martin, 26, Scotia-street, Glasgow.
Gosport and Alverstoke Literary and Scientific Institution	Mr. William Short, 56, High-street, Gosport.
Greenwich	Mr. Jas. Spencer, 3, Wintown-place, Greenwich, S.E.
Halifax Mechanics' Institution	Mr. A. C. Foster, Solicitor, 1, Westgate, Halifax.
Halifax Working Men's College	Mr. Geo. Gibb, Haley Hill, Halifax.
Hartlepool (West)	Mr. Thos. Preston Brunton and Mr. John Thomas Belk Solicitors, West Hartlepool
Hertford	Mr. John Marchant, jun., Port-vale, and Rev. Edward Bartrum, M.A., Head Master of Hale's Grammar School, Hertford.
Hitchin	Mr. Joseph Pollard, High-down, near Hitchin.
Holmfirth	Mr. J. Batley, South-lane, Holmfirth.
Idle, near Leeds (Yorkshire Union)	Mr. James Hall, Idle.
Ingrow-cum-Hainworth	Mr. Jackson, Ingrow-cum-Hainworth.
Ipswich	Mr. Edwin Barrett, 31, Cornhill, & Mr. Herbert Wright, 44, Handford-road, Ipswich.
East Lancashire Union of Mechanics' Institutions, Burnley	Mr. John Sutherland, Post-office, Burnley.
Leeds West Riding Union	Mr. Barnett Blake, Agent of the Yorkshire Union of Mechanics' Institutions. Mr. John Pickering, Secretary of the Leeds Mechanics' Institution.
Leeds Young Men's Christian Association	Mr. J. K. Dall, B.A., 9, East-parade, Leeds.
Leicester	Rev. D. J. Vaughan, St. Martin's Vicarage, Leicester.
Lichfield	Rev. R. M. Grier, B.A., Lichfield.
Liverpool	Rev. A. Hume, D.C.L. and LL.D., 24, Clarence-street, Everton.
Lockwood	Mr. Alfred Lee, Mechanics' Institution, Lockwood.
London, City of London College, Sussex Hall, London, E.C.	Mr. W. H. Hansen, City of London College, Sussex Hall, Leadenhall-street, E.C.

London, Mechanics' Institution	Mr. T. A. Reed, 41, Chancery-lane, W.C.
,, Polytechnic Institution (Limited)	Mr. James Cousins, Polytechnic Institution.
,, St. Stephen's, Westminster	Mr. Samuel Elliot, Emery Hill's School, Rochester-row, Westminster, S.W.
,, St. Thomas, Charterhouse, Evening Classes	Rev. R. Holme, 7, Charterhouse-square, E.C.
,, St. James's, Westminster (Metropolitan Association)	Mr. Joseph Randall, 45, Marshall-street, Golden-square, W.
,, Hackney (Metropolitan Association)	Mr. H. Gray, Working Men's Institute, Triangle, Hackney, N.E.
,, Lambeth (Metropolitan Association)	Mr. E. Heller, Hercules'-buildings, Lambeth, S.
,, Spitalfields and Bethnal-green (Metropolitan Association)	Mr. T. N. Day, Christ Church School, Spitalfields, N.E.
Louth	Mr. Benjamin Crow, Mechanics' Institution, Louth.
Lynn (King's)	Mr. T. Burton, 16, Buckingham-terrace, Lynn.
Macclesfield	Mr. George Stewart, Master of the School of Art, Beech-lane, Macclesfield.
Manchester	Mr. Edwin Simpson, Manchester Mechanics' Institution.
Marske (near Redcar) Literary Society (Yorkshire Union)	Mr. Robt. Richardson, Marske, near Redcar.
Middlesbro'	Mr. William Taylor, Mechanics' Institute, Middlesbro'.
Newbury	Mr. T. Gurney, Newbury.
Newcastle-on-Tyne, Church of England Institute	Mr. Joseph Forster, St. John's School, Newcastle-on-Tyne.
Newcastle-on-Tyne Mechanics' Institution	Mr. Adam Carse, 18, Mosley-street, Newcastle.
Nottingham	Dr. W. Tindal Robertson, Nottingham.
Oldham	Rev. John Hodgson, Queen-street, Oldham.
Paisley	Mr. Charles Dalton Wason, Teacher, St. George's School, Paisley.
Pembroke Dock	Mr. T. H. Eastlake, H.M. Dockyard, Pembroke Dock.
Peterborough	Mr. C. T. Cotton, Long-causeway, Peterborough.
Poole	Mr. Edwin Sloper and Mr. Robert Belben, Accountants, Longfleet, Poole.
Portsmouth	Mr. Andrew Murray, H.M. Dockyard, Portsmouth.
Richmond	Rev. W. Bashall, A.M., 3, Cambridge-villas, Richmond-hill, S.W.
Rotherham	Mr. Frederick Edwards, Solicitor, and Mr. W. Unwin, Currier, Rotherham.
Ryde	Mr. Benjamin Barrow, F.R.C.S. Eng., M.B.M.S., Ryde.
Salford	Mr. Wm. Noar, Borough Treasurer, Town Hall, Salford.
Scarborough	Mr. Thomas Shields and Mr. John Edmond, Town Hall, Scarborough.
Selby	Mr. William Allison, Bank Manager, Selby.
Sheffield	Mr. T. Rowbotham, People's College, Sheffield.
Skipton	Mr. George Kendall, Skipton.
Slough Mechanics' Institution	Mr. James Chapman, Upton-grove, Slough.
Southampton	Mr. W. Johnson, Athenæum, Southampton.
Southern Counties' Adult Education Society	Rev. R. Fitzgerald, Winslade, Basingstoke.
South Staffordshire Union of Educational Institutes	Mr. J. Jones, The Trindle, Dudley.
Thirsk	Mr. J. G. Baker, Market-place, Thirsk.
Wakefield	Mr. W. S. Banks, Solicitor, Wakefield.
Warminster	Mr. Frank Morgan, Warminster.
Waterford	Mr. James Budd, Thomas-street, Waterford.
Wellingborough	Mr. Thos. S. Curtis, Wellingborough.
Wigan	Mr. James Seward, Dicconson-street, Wigan.
Wirksworth	Mr. William Tomlinson, Mechanics' Institute, Wirksworth.
Worcestershire Union of Educational Institutes.	Rev. W. Walters, Hanley-grange, Upton-on-Severn, and Mr. Josiah Jones, Worcester.
York	Mr. Charles Cumberland, Institute of Popular Science, York.

An Appendix, containing the forms that will be forwarded at the proper time to the Local Educational Boards, with the Lists of Prizes and Certificates awarded at the last Examination, and other particulars, is attached to separate copies of the Examination Programme. These may be had *gratis* on application to the Secretary of the Society of Arts.

COTTAGES FOR THE LABOURING CLASSES.

SPECIAL PRIZES.

Two prizes of £25 each are placed in the hands of the Council of the Society of Arts by J. Bailey Denton, Esq., to which is added the Society's medal, to be offered for the most approved designs for cottages, with three bedrooms in each, to be built singly or in pairs, at a cost not exceeding £100 each.

They are offered, one for competition among the members of the Architectural Association, and the other to be open to the United Kingdom.

In order to secure a proper sanitary condition, such provisions are to be made as have the sanction of practical experience.

It is deemed necessary that each cottage should contain, on the ground floor, a living room, of about 150 feet superficial; a scullery, or kitchen, of not less than 70 feet superficial, with a ventilated pantry; and, on the upper floor, three bedrooms, one of which must not be less than 100 feet superficial; in two of the bedrooms fire-places should be provided. The height from ground to first-floor should be 9 feet, and the bedroom, or upper floor, be 8 feet clear.

The memorandum of the Inclosure Commissioners with respect to the substantiality of agricultural buildings (as applied by them under the several Improvement Acts) shall be adhered to. (See Appendix in the next column.)

The drawings are to be on a uniform scale of one-eighth of an inch to a foot, and they are to be not fewer than six in number, viz., two plans, three elevations, and one section.

Each design is to be accompanied by a detailed specification, and an estimate stating in full the quantities of all the materials required, and the *cost* price at which they are calculated. Brickwork at £8 per rod reduced; countess slates at 23s.; and Baltic pine timber at 2s. 3d. per foot cube. In regard to other materials and labour the whole are to be calculated at cost price. An allowance of 20 per cent. is to be made for contingencies and builder's profit, with 5 per cent. for the cost of superintendence, so that the *prime cost* of each house must not exceed £80, which amount must include not only the cottage but the fixtures, water supply or well, fencing, paving, and all those necessary addenda which the cottage owner must provide, and which, costing money to provide, he requires interest for in the shape of rent.

In the selection of the plans for premiums, experienced professional assistance will be obtained, and the estimates will be subject to the examination of a competent surveyor. The designs will be submitted to public inspection, if deemed worthy thereof, and the two most approved will be retained for publication or not, at the option of the Council.

The judges will be an architect, a land agent, and a builder, named by the Council of the Society of Arts.

It would be an advantage if each competitor could name a contractor who will undertake the erection of ten pairs of cottages, according to the design and estimate.

The plans, drawings, and specifications must be sent to the Society's House, John-street, Adelphi, W.C., not later than the 1st of January, 1864.

(By order,)
P. LE NEVE FOSTER, *Secretary.*

APPENDIX.

(*Extracted from the Minutes of the Inclosure Commissioners.*)

The Specifications being often found defective, attention is called to the following particulars:—

A minimum depth should be given for the footings of all walls, piers, &c., the top course not to be nearer to the surface of the ground than six inches; also the depth of all cesspools, drains, tanks, &c.

The general drainage of the site and buildings to be fully described.

The number and thickness of the courses to be specified; those of stone to be about one foot thick in one or two courses.

The description and quality of the bricks to be specified, and the following clause inserted in the Specification: "Every header to be a whole brick, and no half-bricks or bats used in any portion of the walls, except as closers to a course."

The description and quality of stone for walling, lintels, sills, quoins, and other dressings, should be given, and it should be specified that proper bond stones are to be built into all walls of their full thickness, so that there shall not be more than five feet from one bond stone to another, either in the same course or in the courses above or below.

The description and quality of the lime to be specified, together with the proportion of sand.

In all cases where fir timber is used, that obtained from Memel or Norway, and battens from Dram, St. Petersburgh, or other Norway or Baltic ports is to be preferred.

All oak used to be of English growth.

No timber to be placed nearer to the inside of any flue than one foot.

All timbers to be cut die square, and to hold the scantlings specified when finished.

Scantlings of Memel or Norway fir, for the timbers of roofs, &c., in the following table, will be sanctioned by the Commissioners, viz:—

DESCRIPTION OF ROOF.	Span.	Tie Beams.	Principal Rafters.	King Posts.	Queen Posts.	Struts.	Straining Piece.	Sill Piece.	Purlins.	Common Rafters.	Wall Plates.	Pole Plates.
	feet.	in. in.	in. in.	in. in.	in. in.	in. in.	in. in.	in. in.	in. in.	in. in.	in. in.	in. in.
King Post...	18	7½×3	5 × 3	4 × 3	...	3 × 2½	...	...	6 × 3½	3½ × 2	4 × 3	4 × 4
	20	8 ×3	5½ × 3	4½ × 3	...	3½ × 2½	...	...	6½ × 3½	3½ × 2	4 × 3	4 × 4
	22	8½×3½	6 × 3	4 × 3½	...	3½ × 3	...	...	7 × 3½	4 × 2	4½ × 3	4 × 4
	24	9 ×3½	6 × 3½	4½ × 3½	...	4 × 3	...	...	7½ × 3½	4 × 2	4½ × 3	4 × 4
	26	9½×4	6½ × 3½	5 × 3½	...	4½ × 3	...	...	8 × 4	4½ × 2	5 × 3	4 × 4
	28	10 ×4	6½ × 4	5 × 4	...	4½ × 3½	...	...	8½ × 4	4½ × 2	5 × 3	4 × 4
	30	10½×4½	7 × 4	5½ × 4	...	5 × 3½	...	...	8½ × 4½	5 × 2	5 × 3	4 × 4
Queen Post	30	9 ×4	5½ × 4	...	4½ × 4	4 × 3	7 × 4	4 × 4	7 × 3½	4 × 2	5 × 3	4 × 4
	32	9½×4	6 × 4	...	5 × 4	4 × 3½	7½ × 4	4½ × 4	7½ × 3½	4 × 2½	5 × 4	4 × 4
	34	10 ×4½	6½ × 4	...	5½ × 4	4½ × 3½	8 × 4	5 × 4	8 × 4	4½ × 2½	5 × 4	4 × 4
	36	10 ×5	6½ × 4½	...	5½ × 4½	5 × 3½	8 × 4	5 × 4½	8 × 4½	5 × 2½	6 × 4	5 × 4

The trusses in the above table to be about ten feet apart, and the common rafters fourteen inches from centre to centre.

Joists having a bearing of from 10 to 16 feet, to be 2½ inches in thickness, with 2-3rds of an inch in depth for every foot between bearings, and from 16 to 24 feet, to be 3 inches in thickness, with 5-9ths of an inch in depth for every foot between bearings.

Lintels to be generally 4 inches thick, those to all openings over 3 feet 6 inches wide, to have 1¼ inch in depth for every additional foot of opening by the full width of the wall within the reveal.

Where roofs are covered with duchess or countess slates, the same should not be laid with a lap of less than 3 or 2½ inches; each slate to be fastened with two nails.

When slates of a smaller size are used, the lap should not be less than two inches, and at least every other course double nailed.

Nails for slating to be either copper, zinc, galvanised iron, or nails dipped in oil when in a state of red heat.

The ridges, &c., in all cases to be either covered with lead (6 lbs. to the foot), proper ridge tile crest, set and pointed in cement, or with patent slate ridging with , 1, fastened with screws, and set in oil putty.

Flat gutters between roofs, &c., to be laid with lead 7 lb. to the foot.

Cast-iron eaves guttering to be provided to the roofs of all buildings, with proper down-pipes connected to drains to carry off the water; the joints of the guttering and down-pipes to be put together with red lead, and the whole to have two coats of paint before being fixed, and at least one after.

The use of zinc for gutters between roofs, &c., will not be sanctioned.

Especial attention is called to providing an efficient supply of light and ventilation, both in dwelling-houses and farm-buildings, and the means of doing so should be fully described in the specification, and as far as possible shown on the drawings.

All stables, cow and beast-houses, should have ventilation provided in the roofs, as near the ridge as possible, and also, where practicable, long narrow slits should be formed in the gable walls, also near the ridge.

THE GOLDEN PARALLELS.

In a late number of the *Edinburgh Review*, there is a notice of several publications on the subject of gold fields and gold miners. A mass of facts is collected relative to the Australian, Californian, and Columbian gold diggings, and several important conclusions are arrived at. In the first place, we are reminded that the great gold fields already discovered are all included within two regions. The gold-fields of New South Wales and Victoria extend without any interruption along the slopes of the great mountain range which separates the eastern seaboard of Australia from the interior of the continent, and the gold fields of California and British Columbia occur without interruption along the western slopes of the Rocky Mountains. Thus, there are presented two great gold-bearing regions, extending along two widely distant elevations, and probably "owing their auriferous character to some influence connected with their upheaval." The possibility of establishing a connection between these two gold-bearing regions will be understood after a little consideration of their characteristics. The American gold-fields, under various names, run along the eastern seaboard of the Pacific, almost from pole to pole—from Behring's Straits in the north to Cape Horn in the south. Throughout this vast region large quantities of the precious metal are found. "From Chili, in the south, to the British Possessions, in the north, its slopes, spurs, and subordinate ranges are now yielding gold. From Chili we mount through Bolivia, Peru, Equador, New Granada, all still continuing to yield the precious metal, after some three centuries of gold mining. Thence, after we pass the Isthmus, we find the gold miner at work through Mexico, California, Oregon, Washington, till at length we come to the British Possessions, stretching to the shores of the Arctic Ocean." Such is a brief description of the great gold-bearing system of America. Turning now to that of Australia, there is found a coast range running from the extreme northern point of the continent to the extreme southern point. But this range neither begins nor terminates in Australia. It extends across Bass's Straits, on the one hand, and beyond Cape York on the other; in which direction the chain of rocks forms at intervals numerous islands, such as New Guinea, the Carolines, the Ladrones, and others, until Japan, with its gold-bearing rocks, is reached. Thus, in accordance with this theory, the basin of the Pacific has on each side a continuous elevation of volcanic origin. At intervals on both sides gold is now found, from Behring's Straits to New Zealand; and it is stated that at the "beach diggings" in California, a bluish sand, not unlike the pipe clay of Ballarat, is frequently thrown up by the waves, and is found to contain gold in considerable quantities.

The conclusion arrived at by this reasoning is that the great gold fields of the world, as at present known, are included in the vast system of volcanic rocks which surround the Pacific. This chain, though broken here and there, is said to be traceable between Australia and America, and to be easy of identification on both sides of the ocean. Such a continuous and well-marked line of volcanic elevation has often received the attention of geologists. Humboldt's view, which is the one generally accepted on the subject, is that the bed of the Pacific attained its present depth at a comparatively late period; that its unbroken crust, pressed down on the molten mass underneath, caused a quantity of it to rush towards the line of fracture at the edges, and that this disturbed matter found vent in the elevations which are now connected with the gold-fields of America and Australia. So far these considerations, as bearing on the science of geology, are highly important; but it has to be shown in what way gold is to be connected with volcanic shocks in some places and not in others. On this point it is laid down by Sir Roderick Murchison that the rocks which are the most auriferous are of the Silurian age, and that a certain geological zone only in the crust of the globe is auriferous at all. Gold, he states, has never been found in any stratified formations composed of secondary or tertiary deposits, but only in crystalline and palæozoic rocks, or in the drift from those rocks. The most usual original position of the metal is in quartzose veinstones that traverse altered Silurian slates, frequently near their junction with eruptive rocks. Sometimes, however, it is partially diffused through the body of rocks of igneous origin. From this it appears that volcanic eruptions, in connection with Silurian rocks, are to be regarded as the origin of gold formations.

It will have been seen that, according to the volcanic basin theory as described above, the auriferous rocks which surround the Pacific leave Victoria and plunge into the sea to appear again on the other side of Bass's Straits. This would, of course, leave South Australia out of the reach of these gold-bearing ranges. But singularly enough, the reviewer, after remarking upon this termination of the Victorian rocks, refers to the geological work of Mr. Julian Woods in order to show a curious extension of the volcanic action which is to be "traced in South Australia." On referring to the extract, however, it appears that Mr. Woods' reference is not to South Australia, although it relates to the country close upon its border. Mr. Woods says:—"At about fifty miles east of Mount Gambier, on the Victorian side of the boundary, there commences an immense volcanic district, which may be traced with very little interruption to Geelong by immense masses of trap rock and extinct craters of large dimensions. This kind of country extends considerably to the north of the line, and it is underneath the trap rocks there found at the junction of the Silurian slates and ancient granites that the extensive Australian gold-fields are worked." Another extract is given from Mr. Woods' book, embodying a statement similar to that which has been already quoted from Sir Roderick Murchison, namely, that trap rock and other indications of volcanic eruption are no guide to the presence of gold, unless in the neighbourhood of Silurian rocks.

DISTRIBUTION OF RAILWAYS.

A curious paper has just been submitted to the French Academy of Sciences by M. Lalanne, showing that the apparently fortuitous distribution of railways over the surface of a large country is in reality subject to certain laws, which may be stated as follows:—1. The meshes of a network of railways, as their number increases, tend to assume a triangular form. 2. These triangles have a tendency to form groups of six each round a certain point, which, therefore, is the nucleus of a hexagon. 3. When a pentagon happens to replace the hexagon there generally is a heptagon somewhere which makes up the deficiency, so that the number six really represents the average number of lines starting from each point. 4. There are certain exceptional points, such as the capital of the country, towards which more than six lines converge; in this case the number of lines does not exceed 12. 5. In those districts where the network is still incomplete there are centres from which only three lines diverge instead of six; in that case they make equal angles with each other, thus leaving space for the three remaining lines. This strange regularity, now observable in the networks of France, England, and North America, depends upon a primordial law which Buffon calls the reason of reciprocal obstacles. Rivers, mountains, forests, or even the mere inequality in the productive force of different soils, have contributed towards the formation of these regular meshes. Among the consequences which M. Lalanne deduces from this theory of his there is this—that the distance between two agglomerations of population of the same order and near each other must be an extra multiple of the distance between the two agglomerations of an inferior order. Thus, the average distance between two capitals of departments in France is 87 kilometres; that between two contiguous *chefs-lieux d'arrondissements* is 43½ kilometres; and between two contiguous cantons, 14½ kilometres; so that the distance between two prefectures is equal to twice the distance between two sub-prefectures, six times that between two cantons, and 24 times the average distance between two communes.

SUPPLY OF RAW MATERIAL.

Mr. Baker, inspector of factories, in his first half-yearly report for 1863, calls attention to this subject. The growth of flax appears to be decreasing everywhere whence we have hitherto been supplied; and though an annual knowledge of the acreage sown is as essential to the vitality of the linen trade as where cotton is to come from is to the cotton trade, the growth of flax is exciting no very extraordinary attention. The changes taking place in agriculture and the diminution of cottier farms, which are peculiarly favourable to flax cultivation, owing to the cheapness of home labour, and the facility with which flax can be prepared in the first instance, make the matter more important. In England we have no statistics of flax; in Scotland they have been given up; in Ireland they have been collected for years by Mr. Donelly in a most satisfactory manner—a proof of what might be done elsewhere. So with regard to English wool; we guess that there is a sheep to an acre on all the farm lands in England, but whether it is so or not we are totally in the dark. But for Australia, and, even with Australia, but for rags reduced to wool again, and remanufactured, many of our woollen mills would long ago have been at a standstill; and with regard to flax, if there should be a flax famine, as there has been a cotton famine, we should again suffer extremely, with the consciousness that by a little timely forethought those sufferings might have been alleviated if not averted. A company was started in Yorkshire a few months ago, including some flax millowners, for the purpose of collecting flax in this country from the farmers, and preparing it for the trade, but the company has been broken up for want of encouragement even from the trade itself.

Home Correspondence.

THE BRITISH MUSEUM.

Sir,—The extract from Professor Levi's Annals, in regard to the lighting of the British Museum, inserted in your *Journal*, page 618, affords a melancholy proof that we have not yet arrived at the art of constructing buildings that can be either lighted, warmed, or ventilated without the attendant risk of destruction by fire in various degrees, according to the means adopted for the attainment of those several objects.

Mr. Braidwood, the Superintendent of the London Fire-Engine Brigade Department, is naturally induced, by his daily and nightly avocations, to foresee danger wherever fire, or artificial light in any shape, or even simple hot water tubes for warming, or lighting may be introduced, but allows that the British Museum might be lighted by means of oil-lamps or candles with comparative, but not perfect, safety. I will ask that gentleman how it happens that we seldom, if ever, hear of the explosion of the powder-magazines of our war vessels through their own light rooms, which are in habitual use because the magazines are quite out of reach of daylight.

Mr. Braidwood, of course, takes our buildings as he finds them, either not at all, or very inefficiently ventilated, with the ends of beams and rafters not unfrequently running through the fire-flues, filled with a large amount of highly combustible furniture, and abundance of drapery of the fullest description ready to blaze up at the slightest spark. Is it wonderful that, under such circumstances, that gentleman anticipates danger from fire everywhere?

Mr. Braidwood is further of opinion that illumination by means of gas is highly dangerous, and there is no doubt that it is so, considering the way in which most of our public and private buildings are usually constructed; and he also states that the desiccating power of gas flame is excessive, as well as very injurious in many ways. The first danger is that of explosion, but if all buildings lighted by means of gas were sufficiently ventilated for health and comfort, that is to say, if the air in the room was kept nearly as pure as that outside, all loose gas, from its superior brightness, would escape as fast as it leaked out, and no explosion could ever take place. Besides, Mr. Braidwood entirely ignores the beautiful system introduced more than twenty years ago, by Professor Faraday, in the Royal Institution, a system analogous to that adopted in the light rooms of the magazines, in which neither the gas flame nor any of the products of combustion are in contact with the atmosphere of the room.

Gas light is commonly said to be very injurious to the eyes, but so would twelve mould candles, the equivalent of an ordinary argand burner, when burning at the same distance from the eyes. Again, the desiccating property of gas flame would disappear with the admission of the fresh air required for due ventilation, and more elegantly still by causing a fountain to play during the time that the room is occupied and lighted. The general adoption, however, of Faraday's gas light bell and tube would remove all the inconveniences of artificial illumination, but for health and comfort perfect ventilation will still be indispensable in every case of crowded rooms, and here I may notice a very reprehensible custom very generally prevalent, that the instant the last person has left the room, hall, or church, the custodiers carefully close and lock all the doors, so that the effluvia always emanating from living beings are allowed to settle, and permanently adhere, to the walls.

Mr. Braidwood is perfectly justified in condemning the use of sun-burners, the most wasteful and extravagant mode of gas lighting ever invented, though that adopted in the House of Commons is still worse, the sun-burners having to send their light through a ground-glass ceiling, a depth of fifty or sixty feet down to the floor of the house, and, be it observed, that illuminating power diminishes in the ratio of the squares of the distances, so that a single well-snuffed mould candle close at hand would afford more light to the reader or writer at the table than that from the distant sun-burner above.

The good and bad principles of warming and ventilating may be readily illustrated by a few familiar examples. The arrangement of warming and ventilation of the Infirmary at Derby, by the late talented engineer, Sylvester, is of a most perfect description, and the atmosphere of the different wards is always pure and wholesome. The supply of fresh air is drawn from a hilltop, several hundred yards distant. In summer the air is cooled, when necessary, by passing through cold water cases, while in winter it is warmed by passing through the hot cockle, and moistened by having to travel through a shower-bath. All the vitiated air passes out into a foul air-shaft, at the level of the cornices, which are perforated throughout for the admission of fresh air, so that that there is no perceptible draft in any of the wards. The air is perfectly pure and sweet, and of course the dust on the floors is never disturbed.

The exhibition rooms of the Royal Academy are, on the contrary, from bad or no ventilation, very offensive on a crowded day, for the fresh air is supposed to be supplied through extensive perforations in the floors of all the rooms, and the consequence is that the whole of the dust and dirt off the shoes of the visitors, together with the rank smell of shoe leather, rises up to the mouth and nostrils, and may be fairly tasted as well as smelt, thus rendering those handsome rooms exceedingly offensive and disgusting.

The House of Commons is, perhaps, in a still worse predicament, having also perforated floors, through which fresh air, so called, is drawn from the level of the Thames and the sewerage by the power of one or more steam-engines. Hence the complaints of honourable members of hot and cold drafts about their legs, and sometimes of intolerable smells of dust, boot leather, and sewage.

The Crystal Palace, at Sydenham, can hardly be said to be ventilated at all, for it is quite a luxury, after the heat and oppression felt inside, to rush out on to the open terrace outside, even when exposed to the bright, burning sun of July; and the attendants, especially in the refreshment departments, earnestly wish that one-half of the glass was knocked out.

I have seen the walls of a crowded court house, with the doors wide open, but unprovided with ventilation, running down with water, produced by the condensation of the aqueous vapour, to such an extent as to cause extended pools of water on the floor.

I cannot say much in favour of the Great Room of the Society of Arts, but having been built in ages gone by, when ventilation and gas-lighting were myths, perfection is not to be expected. When it was formerly lighted with oil-lamps, and three or four hundred persons were assembled therein, tubs and buckets were required to catch the water which poured down from the skylight, the result of the condensation, by the cold glass, of the aqueous vapour, a convincing proof that no preparation for proper ventilation had been made in the original building. Of course that inconvenience is removed by the intense heat of the sun-burner, which, when first lighted, may be felt at the table, but ventilation is as much required now as formerly. When the room is full, as each person is calculated to vitiate forty cubic feet each hour, it would require a change of from twelve to sixteen hundred cubic feet per hour in order to maintain the atmosphere of the room in a healthy and pleasant condition. I am, &c.,

HENRY W. REVELEY.

PRESERVATION OF IRON-PLATED AND OTHER SHIPS.

Sir,—I have read with much pleasure the interesting paper which has appeared in your *Journal* respecting the patent of Mr. Jean Pierre Jouvin, for preserving iron-plated and other vessels, and metallic articles from oxidation, and preventing ships' bottoms from fouling.

My object in addressing these few lines to you is not to discuss this important invention, but to lay before the members of the Society a few facts which I have observed during the last few years, in the course of some researches which Mr. Richard Johnson and I have made on this most interesting subject.

In the year 1858, Mr. Johnson and I took plates of iron, and covered one surface with $\frac{1}{20}$, $\frac{1}{40}$, $\frac{1}{80}$, and $\frac{1}{100}$ of its extent of zinc plate, which we tied close to the iron plates, and then immersed them in soft and sea water. We examined these plates at the end of one, two, and three months, and finding that the zinc had exercised a very remarkable preservative effect upon the iron, we brought the matter under the notice of Mr. Robinson, shipbuilder, at Newcastle, who promised to institute a series of experiments in connection with his iron ships, to ascertain whether the results we had obtained in my laboratory would be confirmed on a practical scale, but this gentleman soon after fell ill, and ultimately died. In the meantime it occurred to us that the most practical mode of applying zinc for the preservation of iron ships would be to use galvanised iron, and we therefore instituted a series of experiments to ascertain the extent to which protection would be thus afforded.

Plates of iron of three inches square were attached with great care to pieces of oak of the same surface, and immersed in soft and sea water. Similar plates of galvanised iron were also similarly attached to pieces of oak and immersed in soft and sea water, and the following were the results observed after two months' immersion, viz., from January 3rd to March 5, 1862:—

		Loss by corrosion.
Pieces of wood and iron	in distilled water...	1·230 1·230
	in salt water	2·400 2·380
Pieces of wood and galvanised iron.	in distilled water...	0·100 0·125
	in salt water	0·095 0·090

We were anxious to know whether a prolongation of the experiment would continue to show the same comparison, and we therefore again immersed the plates in distilled and sea water until May, 1863, when the iron plates were again removed from the pieces of oak, carefully washed and dried, and weighed.

		Loss by corrosion.
Pieces of wood and iron	in distilled water...	1·700 1·550
	in salt water	4·320 4·280
Pieces of wood and galvanised iron.	in distilled water...	0·500 0·830
	in salt water	0·780 1·220

These results leave no doubt of the great protective power exercised by zinc against the corrosive action of water, and especially of sea-water upon iron plates. I therefore think that all iron used in shipbuilding should be galvanized, and as this operation is now performed with such facility and so little expense, I cannot see any commercial objection to its general adoption. There is a further argument in favour of this course, in the fact that it is not the loss of iron only that is in question, important as that is, but there is also the wood, which, especially in the case of oak, is rapidly deteriorated by the presence of oxide of iron, upon which the gallic and tannic acids of oak exercise a powerful action, and thus cause the wood to enter into a state of rapid decay, or emaracausis, well known to shipbuilders.

Mr. Johnson and I also deemed it advisable to ascertain whether the zinc was liable to be removed from the surface of iron by intense friction, and to decide this point we made the following experiments:—

Large bolts, one foot long and half an inch in diameter, were driven into solid blocks of oak by a sledge hammer. The blocks were then opened and the bolts were found to be not in the slightest degree uncoated. Another series of experiments was made, consisting of driving screws of the same diameter as the bolts into solid blocks of oak, and the same satisfactory results were obtained.

I am, &c.,
F. CRACE CALVERT.

Manchester Royal Institution, Aug. 12, 1863.

Proceedings of Institutions.

WEDNESBURY MECHANICS' INSTITUTION.—The twenty-fifth annual report states that the total receipts for the year amount to £70 6s. 6d., and the expenditure to £112 4s. 3d., showing an excess of payment over receipts of £41 17s. 9d., being £7 1s. 9d. more than the balance in hand with which the year was commenced, thus leaving the Institution that sum in debt to the treasurer. £25 8s. has been spent in books, being £14 more than the amount paid on that item in the previous year. It having been frequently recommended to the Committee to make a large addition to the library, and new catalogues being required, it was resolved before they were printed to obtain a good supply of books, and about 70 fresh volumes were ordered, and 38 others were procured to replace such as were worn out. In examining the library, it was found necessary to re-bind many of the volumes, and on this item £4 7s. more this year than last has been spent. Add to these the cost of the new catalogues (which by the sale will be gradually returned), new table and forms, a set of chessmen and table which have been placed in the reading-room, and it is soon seen how the balance in the treasurer's hands has gradually been reduced. The balance last year was increased by about £5, owing to the expenses on account of the lectures not having all been paid. This year, however, the Lecture Committee was authorised to make all payments, and to hand in a statement showing at once the profit or loss on the course. Notwithstanding that during the year the Committee has largely added to the library, had classes conducted, and carried on an attractive series of lectures and penny entertainments, hoping thereby to add to the popularity of the Institution, yet they are only enabled to report an increase of 52s. in the amount of subscriptions. As has been the custom now for some years past, the Committee made arrangements for a course of lectures to be delivered during the winter. Previous experience showed that those lectures which were of an entertaining character were the ones by far the best attended, and an endeavour was made as far as possible to provide for the gratification of this taste. This led to a greater expense than has been incurred for engagements for some time. It was resolved, however, to admit the members of the Institution at half price, and efforts were made to prevent, if possible, any loss on the course. The committee, however, have to report a deficiency of 30s. as the financial result. The movement which has been set on foot in many parts of the country to give penny entertainments, consisting of vocal and instrumental music, interspersed with readings and recitations, appearing to have met with great success, and to have been very useful, the committee resolved to start in Wednesbury. A commencement was made on the first Monday of the present year, and the entertainments were continued up to the last Monday in March, and the result has proved that here, as elsewhere, they have become very popular. From the statement presented by the Penny Entertainment Committee, it appears that there is a balance in hand of £4 9s. 1d., with which to commence next winter's course, if deemed desirable. The classes were this season commenced about the middle of October, by a general meeting, at which Mr. Jones attended and explained the Examination scheme of the Society of Arts, and of the District Association, and also gave many useful hints on the best methods to be pursued. Afterwards, about twenty names were given in as students, and these were soon further increased to twenty-five or twenty-six. The following classes have been in operation during the winter:—arithmetic and mathematics; writing; reading and dictation; mechanical drawing; English grammar. The attendance at these classes was very satisfactory up to Christmas, sometimes as many as eighteen being present on the Monday evenings. To those who gave their services as teachers the committee tender their best thanks. After Christmas the penny entertainments had the effect of diminishing the attendance on Monday evenings, and arrangements were made for holding that class on Friday nights, yet the number of students did not increase to what it was at the commencement, the average number not exceeding 8 or 10. A desire having been expressed by some students for instruction in chemistry, arrangements were made with Mr. Jones, and a class was started for the study of that subject, which has been in successful operation during the winter, and continues to be well attended. Sixteen students belong to this class. The Committee look upon the class operations of the past year, on the whole, with considerable satisfaction, and they trust that another season they may not only be able to open the various classes earlier, but may find that they are more numerously attended. The large addition made to the library, as already referred to, has resulted, as might have been expected, in a greatly increased circulation of books, the total number this year being 2,297, against 1,731 of the previous year, showing an increase of 566. The Committee have to announce the retirement of Mr. Samson Lloyd from the secretaryship of the Institution, after having been connected with it from the commencement; but they cannot allow the occasion to pass without recording their sense of the value of the services he has rendered to the Instiution, and that when it has been in difficulties—and it often has—he and the late lamented treasurer very liberally assisted to clear off the debt, and again start the Committee free from such an incubus.

PATENT LAW AMENDMENT ACT.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette, August 7th*, 1863.]

Dated 27th May, 1863.

1328. A. P. Hernandez and P. B. Crespy, Bordeaux—Imp. in the manufacture of soap.

Dated 22nd June, 1863.

1562. E. Wilks, Cheltenham—Imp. in making portmanteaus and trunks of various shapes and sizes, light, strong, airtight, and watertight, capable of bearing immersion in water without injuring the contents.

1565. W. Snell, 16, Clement's-inn, Strand—Imp. in arrow-shaped projectiles, and in guns for discharging the same. (A com.)

Dated 24th June, 1863.

1591. P. R. Hodge, 25, Cannon-street—Improved fleeting hydrostatic machinery adapted to presses, dry docks, slips, or the moving or lifting of heavy masses, parts of which are applicable to the expressing of oil or other fluids.

1593. S. Smith, 5, Fell-street—Imp. in the manufacture of liquorice, and in the means or apparatus employed therein.

Dated 29th June, 1863.

1619. G. Davies, I, Searle-street, Lincoln's-inn—An improved cork cutting machine. (A com.)

Dated 2nd July, 1863.

1651. J. King, Chadshunt Farm, near Kineton, Warwickshire—Imp. in fencing land and in hanging gates.

Dated 4th July, 1863.

1664. R. Flude and J. Farndon, Aylestone-street, Leicester—Imp. in looms for weaving narrow fabrics.

Dated 6th July, 1863.

1675. T. W. Coulderry, Old Kent-road—Improved means of attaching boxes or receptacles to hold soap, black lead, or similar household articles to the sides of wash tubs, pails, or house boxes.

1677. S. J. Cooke, 2, St. Michael's House, Cornhill—Imp. in apparatus for supplying carbonic acid gas to casks or other vessels containing beer or other fermented liquid. (A com.)
1679. B. Bonfield, Forest-hill, Kent—Imp. in stoppers for bottles.

Dated 7th July, 1863.

1682. L. J. Guichard and G. G. J. Lefebvre, 10, Rue de la Fidelité Paris—Imp. in lamps, and in the wicks used in such lamps.
1683. W. S. Bruce, Great St. Helen's, Bishopsgate-street—Imp. in lucifer matches, fusees, and other similar lights, and in the boxes or holders for containing the same. (A com.)
1685. G. Bartholomew, Linlithgow, N.B.—Imp. in shoes for the feet of horses and other animals, and in the means of connecting them.
1689. S. Robinson, 129, Great Brunswick-street, Dublin—Imp. in spring hinges for swing doors.

Dated 8th July, 1863.

1691. E. Myers, 2, Millbank-row, and H. Forbes, 6, Aberdeen-place, Maida-hill—An improved method of propelling and steering ships.
1693. W. Bashford, Pewsey, Wiltshire—Imp. in apparatns for generating and purifying gas made from coal or other bituminous substances.
1697. P. A. L. de Fontainemoreau, 4, South-street, Finsbury—A new mode of roofing houses, buildings, and other structures. (A com.)
1699. A. G. Southby, Bradford—Imp. in diverse lamps.
1703. H. D. P. Cunningham, Bury—Imp. in working guns, and in matters relating thereto.

Dated 9th July, 1863.

1705. S. Davis, 33, Strand—An improved anatomical bit for horses or other animals. (A com.)
1706. J. Smith, Berkeley-house, Seaforth, near Liverpool, and S. A. Chease, Egremont, Cheshire—A new description of hydraulic engine for raising water and other fluids above their common level, the fluids so raised to be used as a motive power.
1707. W. Williams, Gutter-lane, Cheapside—Imp. in shirt collars and boys' and ladies' collars.
1709. R. A. Brooman, 166, Fleet-street—Imp. in ships, and in propelling the same. (A com.)
1711. J. F. Delany and J. C. R. Okes, Victoria Foundry, Greenwich—Imp. in the pistons of steam engines.
1715. W. E. Newton, 66, Chancery-lane—Imp. in barometers or gauges for measuring the pressure of fluids. (A com.)
1717. G. Gowland, Liverpool—Imp. in the construction and arrangement of nautical and surveying instruments for measuring angles and altitudes.

Dated 10th July, 1863.

1719. P. A. Godefroy, 7, Shepherd's-lane, Homerton, Middlesex—Imp. in the mode of purifying oils.
1721. M. A. F. Mennons, Abingdon-chambers, Westminster—Imp. in the mode of preserving and protecting the silvering of mirrors. (A com.)
1723. C. De Bergue, Manchester—Imp. in piles for foundations, and in piers for bridges and other buildings or structures.
1727. W. E. Jones, 22, Wellington-road, Clapham, Surrey—Imp. in the permanent way of railways.
1729. J. P. Bourquin, Newman street, Oxford street—An improved construction of rolling press.
1731. R. Hawthorn and W. Hawthorn, Newcastle-upon-Tyne—Imp. in the working of railways.

Dated 11th July, 1863.

1733. E. D. Chattaway, New Broad-street—Imp. in railway signals.
1737. J. Barnes, Nottingham—A new machine for clipping off connecting threads in the manufacture of lace.

Dated 13th July, 1863.

1741. R. D. Dwyer, Warrington, Lancashire—Imp. in the construction of vents for casks and other vessels.
1745. J. Barton, Alfreton, Derby—An improved guard or fence for coal, iron, stone or other pits, warehouse or other lifts, sack holes, or other places requiring a guard or fence.
1747. G. H. Barber, Southampton—An improved calendar or date-denoting apparatus.
1748. J. Laing, 80, George-street, Manchester—Imp. in dyeing or printing. (A com.)
1751. P. C. A. Idocius, Dunkerque, France—Imp. in fishing, and in the apparatus or means to be employed therein. (A com.)

Dated 14th July, 1863.

1753. L. M. Bouruique and J. B. Vidard, Paris—Certain imp. in railway carriages.
1754. J. M. Bouruique and J. B. Vidard, Paris—An improved waggon or truck to be used on railways.
1755. J. R. Cooper, Birmingham—Imp. in sights for rifles and other fire arms.
1757. J. T. Cooke, Leicester—Imp. in and connected with battens for driving shuttles from side to side of their work in weaving.
1759. G. Saxon, Openshaw, Lancashire—Imp. in metallic pistons.
1761. R. Hornsby and J. E. Phillips, Grantham, Lincolnshire—Imp. in reaping and mowing machines.
1763. E. Sonstadt, Loughborough, Lincolnshire—Imp. in the manufacture of sodium.

Dated 15th July, 1863.

1767. E. Funnell, Brighton—A self-acting electro magnetic clock-work signal for railway purposes.
1771. W. Clark, 53, Chancery-lane—An improved process for making paper transparent and transferring designs. (A com.)
1773. M. Henry, 84, Fleet-street—Imp. in figuring, ornamenting, and colouring fulled and felted fabrics and articles. (A com.)
1775. R. A. Brooman, 166, Fleet-street—Imp. in apparatus for telegraphing by electricity. (A com.)
1777. D. Tamet, 103, Vieille Route à Neuilly sur Seine, France—Imp. in breakwaters and in the construction of rail and other ways thereon.

Dated 16th July, 1863.

1779. A. Watson, Glasgow—Imp. in cooking ranges.
781. J. N. Taylor, Brixton, and W. Austin, Mitford, South Wales—Imp. in the construction of ships and other floating bodies.
1783. L. Priestley, Bradford, and J. L. Todd, Morley, Yorkshire—Imp. in the manufacture of elastic boots and shoes, and in apparatus used therefor.
1789. B. Lambert, 35, Lothian-road, Camberwell New-road—Imp. in the preparation of waste paper in order to its being again used in the manufacture of paper.
1791. N. Thompson, 15, Abbey-gardens, St. John's-wood—Imp. in boat building, and in machinery for shaping wood therefor.

Dated 17th July, 1863.

1793. A. J. Sedley, 210, Regent street—Imp. in the canopies of bedsteads of metal or wood, or both combined, and other articles of furniture used to sit or recline upon.
1796. F. Lepoutre, Tourcoing, France—A new mechanical sector, applicable to all self-acting machinery used for spinning textile fabrics.
1797. T. Johnson, Hadleigh, Suffolk—Imp. in machinery for washing and cleansing casks.
1799. R. A. Brooman, 166, Fleet-street—An improved varnish for preserving metal and wood. (A com.)
1801. R. Coenen, 19, Old Broad-street—Imp. in machinery for winding, measuring, and sizing silk. (A com.)

PATENTS SEALED.

[*From Gazette, August 11th*, 1863.]

10th August.
388. J. Jones.
392. W. Robertson.
393. G. Wrigley and S. Morris.
394. O. H. Hodge.
401. J. S. Gisborne and W. Simpson.
410. J. Higgins and H. Higgins.
415. J. W. Crossley.
416. C. D. Abel.
420. R. A. Brooman.
423. S. W. Clough.
424. W. Nalder.
426. T. W. Salmon.
513. G. Bower & W. Hollinshead.
528. T. V. Lee.
561. J. H. Johnson.
708. W. E. Newton.
808. B. W. Goode.
903. G. Low.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

[*From Gazette, August 11th*, 1863.]

3rd August.
1889. R. Bodmer.
4th August.
2086. G. Kershaw.
2088. R. Perrott, jun., and J. Molony.
5th August.
1908. R. A. Brooman.
1923. M. Dodds.
1945. R. Smith.
2052. E. T. Truman.
7th August.
1926. G. H. Newton and A. Wild.
1965. N. Wehnert.
2015. E. Hall.
2055. R. Jobson and R. J. Ransome.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

[*From Gazette, August 11th*, 1863.]

3rd August.
1840. H. W. Wood,
4th August.
1854. J. Y. Borland.
6th August.
1876. T. Whittaker.
2006. B. A. Grautoff and C. H. W. Albrecht.

8th August.
1885. J. Cartland.

LIST OF DESIGNS OF UTILITY REGISTERED.

No. in the Register.	Date of Registration.	Title.	Proprietor's Name.	Address.
4574	July 29.	Steam Engine Standard	Benjamin Miller	Providence-street, Leeds.
4575	Aug. 6.	Improved Steam Trap or Condense Syphon Box	William Oxley.....................	Manchester.
4576	„ 7.	Cartridge Case........	Wm. Barry Lord................	Sandgate, Kent.